

Science SC 1 Skills progression

	EYFS	1	2	3	4	5	6
Overview of learning Red is new learning / skill	Say what they think will happen Make an observation and say if they were right	Gathering data through observation and classification Use equipment (magnifying glass) Record results simply (in a table /with pictures /by grouping)	Plan and conduct simple tests to answering specific questions, Know to change one variable and control the others, answer the specific question	Setting up experiments with an understanding of fair testing. Making predictions that have reasoning behind them. Collecting different types of data (beyond observation) and reporting on and explaining findings	Setting up experiments and collecting different types of data (beyond observation) and reporting on and explaining findings	Justify conclusions using scientific evidence. -Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion	Apply a higher level of understanding to planning, conducting record and concluding.
PREDICT AND PLAN Ask questions Predict	Respond to 'I wonder' questions -Make a guess about what they think will happen - Explore the natural world around them, making observations and drawing pictures of animals and plants; - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;	-That scientific investigation begins with a question they want to find the answer to -Say what they think the outcome of the experiment may be -Ask questions about the world and then make observations to answer these questions.	-Make a prediction on the outcome of the experiment and say why they think that. -Plan a simple test	-That they can set up their own simple practical enquiries by identifying a question they want the answer / responding to a given question to and making sure the test is fair -Understand that fair testing means changing one variable at a time (independent variable) and one thing that may change (that is measured (dependent variable) -That predictions should have reasoning behind them (based on scientific understanding or real life experiences)	-That they can set up their own simple practical enquiries by identifying a question they want the answer to and making sure the test is fair (Y3) -To plan and carry out comparative tests -Understand that fair testing means changing one variable at a time (independent variable) and one thing that may change (that is measured (dependent variable) Y3 -Make relevant predictions based on their increasing scientific knowledge that will be tested in a scientific enquiry. Is there enough progression here? Is Y3 expectation too high? -use research, observation and experiments to answer questions?	-That scientific enquiry is framed by asking relevant questions and using different types of scientific enquiry to answer them (Y3/4) independently plan a fair test recognising and controlling variables where necessary -plan different types of scientific enquiry – what does this mean? -plan in factors to ensure reliability of results (e.g. take multiple measurements)	-Recognising and controlling variables where necessary -Understand that fair testing means changing one variable at a time (independent variable) and one thing that may change (that is measured (dependent variable) -Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth) -Know examples of instances where scientific evidence has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection) -That a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry
CONDUCT Observe Measure Time Equipment that should be mapped into year groups Magnifying glasses, thermometers Timers, rulers, data loggers	Try out their guesses and observe what happens Observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object	-That they can use magnifying glasses to observe objects closely -That objects can be identified or sorted into groups based on their observable properties (Classification)	-Set up and perform simple tests e.g. how seeds and bulbs grow into mature plants -Use systematic observation to gather results to answer a question. -That observation is a valid way of collecting data about changes.	-That equipment should be used systematically and carefully to take accurate measurements using standard units and a range of equipment, including thermometers, data loggers, rulers and stopwatches	-That equipment should be used systematically and carefully to take accurate measurements using standard units and a range of equipment, including thermometers, data loggers, rulers and stopwatches need different equip	- That scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry -take accurate measurements using standard units, using a range of equipment, what equip? with increasing accuracy and precision, taking repeat readings when appropriate	- Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device -Know how and when to repeat measurements, how to find an average of a set of measurements and -how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement
RECORD Draw Tables Labelled diagrams KS2 Graphs	After close observation, draw pictures of the natural world, including animals and plants.	Write down words and numbers into pre-drawn tables or draw pictures to record what they find	Record results to experiments can be recorded in different ways: a table, a labelled diagram	Results can be classified and presented in a variety of ways to help answer questions e.g. recording findings using simple scientific language, drawings (Y1), labelled diagrams (Y2), keys, bar charts, and tables (Y2) For example: Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key.	-Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table do you agree with this? Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion	Data can be gathered and presented in a variety of ways to help answer questions e.g. recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables of increasing complexity using scientific diagrams and labels, classification keys, scatter graphs, bar and line graphs -Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion	Data can be gathered and presented in a variety of ways to help answer questions -Choose the best recording method to present their data -Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion -To include areas of improvement and further research questions to investigate

<p>CONCLUDE Analyse Notice patterns Explain</p>	<p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p>-Use their observations and ideas to suggest answers to questions -Suggest an answer based on real life experience</p>	<p>-That they can use their observations and knowledge to suggest plausible answers to questions using taught scientific knowledge</p>	<p>-Use results to draw simple conclusions that answer the investigation question based on their results. -Draw a conclusion based on the relationship between the independent and the dependent variable (the bigger the... the smaller the... – the 'er 'er rule) -Report on findings from enquiries, (including oral and written explanation)</p>	<p>-Report on findings from enquiries, -Draw a conclusion based on the relationship between the independent and the dependent variable (the bigger the... the smaller the... – the 'er 'er rule) - be able to use straightforward scientific evidence to answer questions or to support their findings. -use results to draw simple conclusions suggest improvements and raise further questions -identify differences, similarities or changes related to simple scientific ideas and processes -Ask and be able to plan further questions as a result of the enquiry (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc)</p>	<p>-Use test results generate further questions, make predictions and set up further comparative and fair tests -Justify their conclusions using scientific evidence. -Make conclusions that include noticing causal relationships and explanations of and degree of trust in results -To draw a conclusion based on the relationship between the independent and the dependent variable (the bigger the... the smaller the... – the 'er 'er rule)</p>	<p>-Analyse and compare data, noticing patterns and relationships -Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary -Know how to identify conditions that were imperfectly controlled and explain how these might affect results (confounding results)</p>
<p>VOCAB</p>		<p>properties, observe, test, magnifying glass, object, record, equipment</p>	<p>investigate, measure, predict, conclude, data, sketch, label,</p>				

Knowledge progression

PLANTS							
	EYFS	1	2	3	4	5	6
Key Knowledge	-Plants need water -Name simple plants - sunflower, lavender, daffodil	Identify and name at least 2 garden plants and two wild plants including deciduous and evergreen trees Identify leaves, flowers, petals, fruit, roots, bulbs, seeds, trunk, branches, stem -Know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn -Know that a flowering plants consist of roots, stem, leaves and flowers, and that a tree's stem is called a trunk	- Plants grow from seeds and bulbs -Plants need water, light and the right temperature. -Germination is when a seed starts to grow. -Know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth) -Know that plants that are deprived of light, food or air will not grow and will die. -Know that plants produce seeds that grow into new plants that are the same. <i>Investigation - What conditions are best for germinating seeds and growing plants?</i>	-Know role of roots, stem, leaves and flower -Know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground Know that the stem holds up the leaves so that they can gather light to make food and holds up the flowers so that they can receive pollen and disperse their fruits; know that the stem also transports water and minerals from the roots to the other parts of the plant Know that the leaves make food by trapping light and using its energy to turn carbon dioxide and water into carbohydrates Know that the function of a flower is reproduction, where flowers of the same kind exchange pollen – made by an anther – in a process called fertilisation, and a structure in the flower's ovary called an ovule becomes a seed; the ovary then becomes a fruit which helps the seed leave the plant in a process called dispersal -Plants need air, light, water, nutrients from soil, and room to grow. -Pollination leads to seed formation then seed dispersal	-Know what distinguishes plants as a group from animals (make own food from sunlight, usually do not move around) What unit is this taught in?	-Plant begins as a seed, grows then produces seeds -Understand difference between <i>asexual</i> and <i>sexual reproduction</i> in plants	
Possible class tasks	Explore the natural world around them Describe what they see, hear and feel whilst outside.	Label the basic structure of a common/wild flowering plant?	Observe plants growing from seeds Bean plant in a jar.	How water is <i>transported</i> in plants. Celery in blue food dye (predict, observe, conclude) Draw a diagram to show the stages of the life cycle of a flowering plant include pollination, seed formation and seed dispersal		<i>Draw a life-cycle for a plant.</i> How can we make new plants? Take cuttings from a geranium plant, which is an artificial method of asexual reproduction. Children could use the school garden, vegetable plot or large containers to grow their own potatoes. When they Harvest them; they will see the tubers that have formed underground to create new plants for next season. Observation conclusion	
Working Scientifically focus	Observe plants growing?	What's the most common plant? <i>Observe, record, conclude</i>	what happens if I remove light / water / soil from a plant? Observing different plants. Set tests to understand what plants need to germinate and grow.	Do plants need soil to grow?			
Vocab	Plant, water, life	energy, growth, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower, daisy, rose, daffodil	-Germination reproduction, bulb, seed, survival, temperature	Pollination seed formation, dispersal fruit, nectar, anther, ovary, ovule, petal, pollen, stigma, style, stamen, function, exchange, dispersal, fertilization		asexual and sexual reproduction	

Animals including humans							
	EYFS	1	2	3	4	5	6
Key Knowledge Bold to be retained by all		Name at least one fish, amphibian, and reptile. Identify cow, dog, cat, pig, blackbird, sparrow, Identify simple differences between animals – eg legs/no legs, wings, feathers, fur, scales, beak, what they eat. Know that herbivorous animals eats plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants	Know animals including humans have babies (offspring) that grow into adults. Know they need food, water and air	Know that animals, including humans, cannot make their own food. Know that different animals eat different sorts of food. Know animals have skeletons to protect and support them.	Understand a food chain starts with the sun, then a plant, then an animal, usually herbivore then carnivores. -Know that a food chain traces the path of energy through a habitat Know that all energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers		Know difference vertebrates and invertebrates Know the 5 vertebrate groups (reptile, mammal, bird, amphibian, insect) Know some common invertebrate groups, e.g insects, spiders, worms, snails)

		<ul style="list-style-type: none"> -Know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone -Know that fish are different in having gills so that they can breathe underwater and scaly skin -Know that amphibians are different in that they begin their lives with gills but then develop lungs and breath on land -Know that reptiles are different in that they breath air and have scaly skin -Know that birds are different to other animals in that they have feathers and wings -Know that mammals are different to other animals in that they have fur/hair and they feed milk to their young. 			<p>Know that consumers take in energy by eating Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator Know that the first consumer in a food chain is called a primary consumer, the second is called a secondary consumer and above it is called a tertiary consumer Know that the arrows in a food chain show the direction that energy is travelling through a habitat.</p>		
Possible class tasks	<p>Observe life cycles of animals: caterpillar-butterfly, egg hatching to chick/duckling Identify changes over time</p>	<p>What common animals are carnivores, herbivores and omnivores? Categorise Dinosaurs – Carnivore, herbivore, omnivore Identify and classify animals into groups</p>					<p>Classify and group Be able to put example animals into the right group using observable characteristics</p>
Working Scientifically focus		Do all reptiles have scales?					
Vocab		energy, growth, habitat, fish, amphibian, reptile, bird, mammal, offspring, carnivore, herbivore, omnivore, vertebrate, skeleton, organ					

Animals including humans							
	EYFS	1	2	3	4	5	6
Key Knowledge Bold to be retained by all	<p>Know basic hygiene, eg wash hands.</p> <p><i>Healthy, clean, dirty</i></p>	<p>Name head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth.</p> <p>-Have an awareness that we also have parts inside our body - bones, heart, lungs, blood.</p> <p>-Know that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch and that these are all our senses.</p> <p>Know how to keep our teeth clean - how many times a day for how long. To know what keeps our body healthy - sleep, diet, exercise Handwashing and being hygienic</p>	<p>Know animals including humans have babies (offspring) that grow into adults.</p> <p>Know humans need to eat good foods like vegetables, fruits, things like rice and bread and potatoes, and protein, and not too much fat and sugar.</p> <p>Understand that to stay healthy, humans need to - exercise to help their body stay strong and fit -keep things clean, including washing and brushing teeth, -Eat the right amounts of different types of food</p> <p>-Know the basic food groups: fruit and vegetables, carbohydrates, protein, dairy, fat and sugary foods -Know that more than half of our diet should be made up of carbohydrates, fruit and vegetables -Know that fats and sugary foods should be eaten rarely and in small amounts -Know that people need to exercise often</p>	<p>Know that animals, including humans, cannot make their own food.</p> <p>Know they need to eat the right types and amount of food.</p> <p>Know that different animals eat different sorts of food.</p> <p>Know humans and some other animals have skeletons to protect and support them.</p> <p>Know humans have muscles for movement</p>	<p>Know that adult humans have 32 teeth Identify teeth – incisors, canines, premolars and molars, wisdom teeth</p> <p>Know what the different teeth do – Know that incisors slice food, canines tear food (especially meat) and that molars grind food Know that children develop an initial set of teeth which are gradually replaced between the ages of 6 and 12</p> <p>Be able to label the different parts of the digestive system – mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine</p> <p>Know that food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion</p> <p>-Know that the process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body. It begins with food being chewed in the mouth by the teeth and saliva added -Know that food is squeezed down the oesophagus towards the stomach in a wave-like action called peristalsis -Know that the stomach releases acid and enzymes to continue breaking down the food; the stomach is an organ; an organ is a</p>	<p>Identify changes for humans as they age, using a timeline. Understand <i>puberty</i> prepares our bodies for being adult. Know other animals age at different rates.</p> <p>Know that humans go through stages of development; they begin as fertilized eggs and then develop into embryos before developing into babies; once they are born, these newborn babies become infants (roughly 2 months to 2 years) then into young children (roughly 2-12 years old); children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently</p>	<p>Identify heart, blood vessels, veins, arteries</p> <p>Know that blood travels around the body transporting nutrients that have been absorbed into the bloodstream from digestion; blood also carries oxygen around the body which is used to power the body; this use of oxygen to create energy is called respiration</p> <p>Describe one way that diet, exercise, drugs can affect the body positively and one way negatively.</p> <p>Know that the heart and lungs are organs protected by the ribcage Know that the heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins – bold? Know that the heart is composed of four chambers: two atria and two ventricles; the aorta is the largest artery in the body and most major arteries branch off from it Know that when we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates -Know that drugs are chemicals that have an impact on the natural chemicals in a person's; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused</p>

			-Know that keeping clean, Investigation -		part of living thing that is self-contained and has a specific important job -Know that further enzymes and bile break down the food further as it moves through the duodenum towards the small intestine -Know that the small intestine adds more enzymes and then absorbs the nutrients -Know that the large intestine absorbs water from the undigested food -Know that undigested food is stored in the rectum before being excreted through a muscle called the anus		Know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller Know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects, such as liver disease and lung disease, respectively
Possible class tasks	Talk about what is the same and what different about friends and family Talk about how do we keep our teeth clean Visit from Dental hygienist	Label basic parts of the body/ Human Torso Name which part of the body is associated with each sense?	Research how do animals grow Match animals/babies. Describe changes Explore food groups. Record ways that exercise affects the body	Compare how plants and humans obtain food Identify and name bones using skeleton model Examine how muscles work Investigate pairs of muscles	Explain what are the different purposes of teeth in animals and humans?	-Describe and record the changes of life from a baby and as we go through puberty? Draw a life-cycle diagram for a human. -Children to create a collage using pictures labelling stages of development. -Research using secondary sources of information - gestation periods of different mammals compared to humans	Draw diagrams and describe ways in which nutrients and water are transported within animals, including humans? Describe the short term effects happen to your body through exercise? Describe the long term effects on our body through regular exercise?
Working Scientifically focus		Are all red/green apples sweet/sour?		Does having a longer humorous mean that you can throw a ball further? Does having a longer thigh bone mean that you can run faster? Focus: full investigation	Tooth decay experiment with egg shells what is it? Focus: full investigation		Does our pulse rate increase or decrease with exercise? This feels like Y2
Vocab			reproduction, offspring, adult, survival, hygiene, exercise Vegetables, fruit, protein		mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine		artery, aorta, atrium, blood vessels capillary, circulatory system, vein, pulse, ventricle, replenished, resting heart rate, diet

Environment: Living things and their habitats; rocks; evolution and Inheritance								
	EYFS	1	2	3	4	5	6	
Key Knowledge Bold to be retained by all		See animals and humans	Identify if something is <i>alive, dead, or never alive</i> . Understand things are <i>suited to the habitats</i> they live in. The habitat provides food, water and shelter. Know food chains with plants Revisit idea of carnivore, herbivore and omnivore	Know fossils are formed when something dies and is buried in rock. Know that soil is a mixture of crumbled rock and dead plants and animals.	Know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behavior (e.g. herbivores, carnivores and omnivores) Know that living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms Know that a species is a group of living things have many similarities that can reproduce together produce offspring is it bold? Know that a classification key uses questions to sort and identify different living things Know how to use a classification key to identify living things Know that changes to the environment can make it more difficult for animals to survive and reproduce; in extreme cases this leads to extinction, where an entire species dies Know that human activity – such as climate change caused by pollution - can change the environment for many living things, endangering their existence Use terms predator, prey, producer. Understand that plants and animals can be affected if the environment changes.	Name some differences between the groups mammal, amphibian reptile, insect and birds eg M only ones that start as babies inside mothers, are fed milk by their mothers, or A and I have thousands of eggs. Know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants Know that in most mammals (e.g. dogs) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again Know that in amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin again	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals Know difference vertebrates and invertebrates Know the 5 vertebrate groups (fish, bird, mammal, reptile, amphibians) Know some common invertebrate groups, eg insects, spiders, worms, snails) Do we need to know all of this? (below) Know that an arthropod is an invertebrate with a hard, external skeleton and jointed limbs Know that insects are a type of arthropod; their bodies consist of six legs, a head, a thorax and an abdomen; most insects also have a pair of antennae and a pair of wings Know that an <i>arachnid</i> (e.g. spider) is a type of arthropod with eight legs and no antennae or wings	Evolution and Inheritance Know that living things produce offspring of the same kind. Know offspring are similar to but not identical to parents (variation). Understand that variation has meant living things have changed over time. Understand that variation means that animals become more or less able to survive where they live. Understand/Know that animals and plants that are able to survive are adapted to suit their environment. Know that the process of <i>adaptation</i> leads to <i>evolution</i> Know that living things changes over time and that this gradual change is called evolution Know that fossils tell us about living things from millions of years ago. Know that the gradual change of species over millions of years can be observed by looking at examples of fossils.

					<p>Know that in many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin again</p> <p>Know that in birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin again</p>	<p>Know that a <i>crustacean</i> is a type of arthropod with two pairs of antennae (e.g. woodlouse)</p> <p>Know that a <i>myriapod</i> is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede)</p> <p>Know that there are three types of micro-organism: viruses, fungi and bacteria</p> <p>Know that germs are disease-causing bacteria</p>	<p>Know that all life on Earth began from a single point around 4.5 billion years ago</p> <p>Know that natural selection works as across a species there is natural variation within a species; there is also competition to survive and reproduce and that members of a species with advantageous characteristics survive and reproduce - these characteristics are passed down to their offspring; members of a species with less advantageous characteristics do not survive and reproduce – these characteristics are not passed down to offspring</p> <p>Know that offspring are vary and are not identical to their parents</p> <p>Know that Charles Darwin posited this theory of evolution by natural selection</p>	
Possible class tasks			<p>Draw arrows on a <i>food chain</i> to show what eats what (specific living things). Identify plants and animals in at least one micro-habitat and one larger habitat. Compare difference between things that are living, dead or never been alive.</p> <p>Explain how do animals get their food?</p> <p>Draw diagrams of food chains</p>	<p>Classify Put rocks into groups eg colour, <i>crumbly</i>, <i>hard</i>, <i>grainy</i>, have <i>crystals</i>, have <i>fossils</i> in them</p> <p>How many different types of rocks are there?</p> <p>Group different rocks based on their appearance and properties.</p> <p>Research and explain how fossils are formed when things that have lived are trapped within rocks?</p> <p>Compare fossils to the animals they belong to</p> <p>Explain How is soil formed</p>	<p>Follow a key to identify animals and plants</p> <p>Explore animals and plants in a local habitat.</p> <p>Access environmental dangers in the local habitat, research endangered and extinct species</p> <p>Create a classification key to sort plants on the school premises</p>	<p>Draw a life cycle diagram for another mammal (M), an amphibian (A), a reptile (R), an insect (I), a bird (B). Compare the life cycles of amphibians and insects</p>	<p>Children will investigate information on Edward Jenner using secondary sources of information – how does this link with classification? wouldn't Darwin be better?</p> <p>What makes food mouldy</p> <p>Be able to put example animals into the right group.</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p>	<p>Explain how have living things changed over time?</p> <p>What does variation and inheritance mean?</p> <p>Observe inheritance and variation by looking at photographs of children and their parent. What traits have they inherited?</p> <p>Research and discuss plants and animals that live and survive in different habitats</p>
Working Scientifically focus			<p>Whats the investigation e.g. are snails omnivores?</p>	<p>Are all rocks permeable?</p>				
Vocab					<p>predator, prey, producer, environment kingdom, classification key, species, fungi, bacteria, climate change, characteristics, offspring, extinction, pollution</p>	<p><i>reproduce</i></p> <p>life cycle, life span, embryo, womb, weaned, adolescence, metamorphosis, pupa, larva, chrysalis, caterpillar, tadpole, hatchling, fledgling, insect</p>	<p>microorganism, virus, thorax, arthropod, abdomen, arachnid, antenna, jointed limbs</p>	<p>evolution, natural selection, variation, advantageous</p>

Materials / Properties and changes of materials / states of matter						
	EYFS	1	2	3	4	5
Key Knowledge Bold to be retained by all	Choose materials to build with. <i>Wood, plastic</i>	<p>Name objects and then say what they are made of, covering wood, plastic, glass, metal, water and rock, brick, paper, fabric.</p> <p>Say whether a material is hard/soft; stretchy/stiff; shiny/dull</p> <p><i>rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</i></p> <p>Group materials eg all hard ones compared to all soft ones.</p> <p>Know there is a difference between an object and the material it is made from.</p>	<p>Know a <i>force is used to to bend</i> and <i>squash</i> materials</p> <p>-Know rigid means something that will not bend without breaking</p> <p>-Flexible is something that can bend without breaking</p> <p>-Know different materials have different properties</p> <p>For at least two materials, link a property to how suitable these materials are for particular uses, eg bricks used for houses cannot be squashable, material used for windows must be transparent.</p>	See Rocks	<p>Identify whether a material is a solid, a liquid or a gas</p> <p>Know how particles are arranged in solids, liquids and gases.</p> <p>Know that materials can change state when heated or cooled</p> <p>Know that water changes state at about 0°C and 100°C</p> <p>Know that evaporation is different from boiling</p> <p>Know evaporation is more rapid at higher temperatures.</p> <p>Know that water evaporates, then condenses to fall as rain</p>	<p>Understand meaning of hardness, solubility, transparency, conductivity (thermal and electric), and magnetic.</p> <p>Understand meaning of dissolving and solution – know that some materials are soluble in water and some not .</p> <p>Know methods of separating materials – filtering, sieving and evaporating.</p> <p>Know a property and associated use of metals, wood and plastic.</p> <p>Know the difference between reversible and irreversible changes</p> <p>Know dissolving, <i>mixing</i> and changes of state are reversible.</p> <p>Know that irreversible changes can make a new material</p> <p>Know burning and action of <i>acid</i> on <i>bicarbonate of soda</i> are irreversible.</p>
Possible class tasks	What are the different materials that we use? Name what objects are made of	Group materials according to their properties	Classify and group materials according to how easily materials can be <i>squashed, bent, twisted and stretched</i> What are the uses of everyday materials? Classify and group the uses of everyday materials. Classify the suitability of different materials. Who discovered new materials? To find out about people who have developed new materials, by learning about John McAdam.		<p>Draw a diagram of the <i>water cycle</i></p> <p>Investigate how we sort materials into solid, liquid and gas, using fizzy drinks to investigate how much gas weighs.</p> <p>Heating and cooling: Melting chocolate.</p> <p>Evaporation investigating how long it takes materials to dry.</p>	<p>Group materials by these properties: <i>hardness, solubility, transparency, conductivity (thermal and electric), and magnetic.</i></p> <p>-Conduct two irreversible chemical changes to make new materials</p> <p>Explore and conclude: How can solids be separated? (Sieving) How can solids be separated from liquids(filtering /) How can solids that have dissolved be reversed (evaporation) Can all materials be changed and reversed?</p>
Working Scientifically focus		Which materials are waterproof? Which material is best to keep you dry?			<p>Does temperature affect how quickly something dries?</p> <p>Ice cube investigation what is it? Is this insulators?</p> <p>Focus: Conduct, record and conclude</p>	What material makes the best filter?

Vocab	Wood, plastic	bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent	squashed, bent, twisted and stretched			hardness, solubility, transparency, conductivity (thermal and electric), and magnetic.	
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Forces and Magnets							
	EYFS	1	2	3	4	5	6
Key Knowledge Bold to be retained by all	Know some things <i>float</i> and some <i>sink</i>		Know a <i>force</i> is used to to <i>bend</i> and <i>squash</i> materials Taught in materials?	<p>Know that a force can be thought of as a push or a pull</p> <p>Understand that the <i>roughness</i> of a <i>surface</i> affects how things move</p> <p>Know <i>friction</i> is a force between two surfaces in <i>contact</i></p> <p>Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves</p> <p>Know magnets <i>attract</i> and <i>repel</i> each other</p> <p>Know magnets have 2 <i>poles</i> called <i>north</i> and <i>south</i></p> <p>Know that N and N, and S and S, repel and N and S attract</p> <p>Know that there is a magnetic field around a magnet which is strongest at each pole</p> <p>Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic</p> <p>Know that there are three types of contact force: impact forces (when two surfaces collide), frictional forces (when two surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed) – do we need this?</p> <p>Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force</p>		<p>Know <i>unsupported</i> objects fall because of <i>gravity</i> between earth and the object.</p> <p>Identify forces and their effects: <i>Air resistance, water resistance, friction</i></p> <p>Know air resistance, water resistance and friction act between moving surfaces in contact</p> <p>Know <i>levers</i> and <i>pulleys</i> make lifting easier</p> <p>Know that a force is measured in a unit called Newtons, named after a British scientist called Sir Isaac Newton who discovered lots about gravity and how planets move</p> <p>Know that pull forces can be measured using a device called a force meter</p> <p>Know that the amount of matter (stuff) in an object is its mass</p> <p>Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together</p> <p>Know that unsupported objects are pulled towards the Earth by the force of gravity</p> <p>Know that acceleration is a change in speed and that unbalanced forces acting on an object cause it to accelerate</p> <p>Know that air resistance is a force felt by an object as it moves through the air; it is caused by the object bumping into the gas particles that make up air; the quicker an object moves, the more gas particles it bumps into and the more air resistance it experiences</p> <p>Know that a falling object will accelerate until its air resistance matches the gravitational force pulling it down; at this point, the object will continue to move at this speed (called its terminal velocity) without getting any quicker or slowing down</p> <p>Know that a parachute's shape increases the air resistance that a falling object experiences, giving it a much lower terminal velocity</p> <p>Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles</p> <p>Know that the shape of an object determines how much air resistance or water resistance it experiences; shapes of object that experience little air resistance or water resistance are described as streamlined</p> <p>Know how to draw a force diagram with arrows representing the different forces acting on an object</p> <p>Know that a lever is a rigid length pivoting around a fulcrum</p> <p>Know that a pulley is a wheel with a fulcrum that supports a moving cable or belt</p> <p>Know that a gear is a rotating wheel with cut teeth that mesh with the teeth of another gear so that turning one gear turns an adjacent gear in the opposite direction</p> <p>Know that gears, levers and pulleys are simple machines that used to allow a smaller force to have a greater effect; they do</p>	

						<p>this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger forcer over a small distance at the other end</p>
Possible class tasks			See materials	<p>Research different types of forces acting on objects Test which everyday materials are magnetic?</p>		<p>Explore how does gravity cause objects of the same size and shape but of different mass to fall at the same rate?</p>
Working Scientifically focus			See materials	<p>What surfaces have more friction? (measured by speed or distance travelled?) Investigate the speed of a toy car over different surfaces</p> <p>How do objects move on rough and smooth surfaces? – needs refining</p> <p>Focus – full investigation Which materials provide more/less friction? Friction - by comparing different materials to see which one slides the best</p>		<p>Does mass affect the speed which an object falls at? Does surface area affect the speed which an object falls at? Does the area of an object affect whether it floats or sinks?</p> <p>Parachute experiment Air Resistance Boat Race investigation/Water Resistance</p> <p>Fully investigation Plan, conduct, record, conclude & explain</p> <p>Investigations: Does the size of the canopy affect the fall of a parachute? Air resistance - making parachutes with different sized canopies and timing the drop; Does the shape of a boat affect the way it moves through water? Water resistance - making boats to see which one travels through the water the fastest;</p>
Vocab	Float, sink, light, heavy			magnetic, non-magnetic, pole, north, south, sliding friction, static friction, elastic, resist, attraction, repulsion		acceleration, air resistance, buoyancy, effort, force meter, fulcrum, gravity, load, mass, mesh, Newton, pivot, rigid, streamlined, terminal velocity, unsupported, water resistance, weight

Electricity							
	EYFS	1	2	3	4	5	6
Key Knowledge Bold to be retained by all					<p>Identify things at home and school that run on <i>electricity</i></p> <p>Identify the following things in a circuit: <i>Cell, wire, bulb, switch, buzzer, lamp.</i></p> <p>Know a circuit with everything in a single loop is a <i>series</i> circuit.</p> <p>Know there must be a complete loop for electricity to flow.</p> <p>Know most metals are good <i>conductors</i>. Name some insulators eg wood, plastic.</p> <p>Know an open switch stops the electricity and a closed switch lets it flow.</p>		<p>Use the circuit <i>symbols</i> for bulb, switch, cell and wire.</p> <p>Know that in a series circuit more cells make lights brighter or buzzer sound louder.</p> <p>Know that more cells provide greater voltage, so more energy</p> <p>Know an open switch stops the bulb or buzzer working and a closed switch lets it work</p> <p>Understand that an open switch stops the electrical <i>energy</i> flowing to the bulb or buzzer</p>
Possible class tasks					<p>What is needed to create a switch and buzzer? Create a simple circuit, create the circuit, create the circuit with a switch, create the circuit with a switch and a buzzer, testing insulators and conductors.</p>		<p>-Constructing circuits with a bulb, switch, motor and buzzer. -Making a bulb brighter, making a burglar alarm and pressure pad -Build a parallel and series circuit, explain how they work, place a build in different places within the circuit and investigate the effect</p>
Working Scientifically focus					<p>Investigation which materials is the best conductor? Full investigation: Plan, conduct, record, conclude & explain</p>		<p>How does the voltage of the battery affect the brightness of the bulb? How can I make my bulb sine brighter? Will adding variables affect my circuit?</p>

Light & Sound							
	EYFS	1	2	3	4	5	6
Key Knowledge Bold to be retained by all				<p>Know <i>darkness</i> is the absence of <i>light</i></p> <p>Know we need light to see</p> <p>Know they must not look at the sun directly - light from the sun can be dangerous</p> <p>Realise that light is <i>reflected</i> from surfaces</p> <p>Know we get <i>shadows</i> when light is blocked by an <i>opaque</i> object.</p> <p>Know that sizes of shadows change, and identify patterns in that eg shadows get bigger or fuzzier when object is near the light.</p>	<p>Know sounds are made by something <i>vibrating</i></p> <p>Know that sounds travel through something to get to our ears</p> <p>Know the <i>pitch</i> of the sound depends on the thing producing it.</p> <p>Know the faster the vibration the higher the pitch</p> <p>Know the <i>volume</i> of a sound depends on the strength of the vibration producing it.</p> <p>Know that sounds get fainter the further away they are</p>		<p>Know that light travels in straight lines</p> <p>Understand that this explains why shadows have the shapes they do.</p> <p>Understand that we see a light because it sends light to our eyes</p> <p>Understand that we see other objects because light hits them and they reflect it to our eyes.</p>
Possible class tasks				<p>Investigate how shadows are formed and change (shape, definition)</p> <p>Explain what a shadow is</p>	<p>How does sound travel?</p> <p>-Investigating vibrations and the link between the size of vibration and the loudness of sound.</p> <p>Explore pitch, investigating sound travelling over distance - string phones, sound proofing an different materials, making instruments.</p>		<p>How do we show that light travels in a straight line to explain why shadows have the same shape as the objects that cast them?</p> <p>-shadow puppets – blocking light, proving light travels in a straight line. this is very similar to Y3 would it be better to use mirrors to prove the straight lines?</p> <p>Refraction of light through glass, water and air with the disappearing coin and the reversed arrow experiments</p> <p>Is this KS2 or KS3? Splitting white light into the colour spectrum using prisms and torches on black card, finely spraying a hose pipe in sunlight to create a rainbow</p> <p>What happens when light passes through one medium to another?</p>
Working Scientifically focus				<p>This needs a focus eg. You could look at which types of objects, transparent/opaque/translucent make the clearest/darkest shadows</p> <p>Does how close the object is to a light source affect the size of the shadow?</p> <p>As objects move towards or away from a light source, does the size of the shadow increase/decrease?</p> <p>Focus: Conduct, record and conclude</p>	<p>Might need to tighten up this question: what material makes the best phone receiver? – how does this link to sound knowledge?</p> <p>Does changing the receiver with a different material on a string affect the sound we hear?</p> <p>Children will understand which materials sound travels well in and which it does not</p> <p>Focus – full investigation</p>		
Vocab							

Seasonal Change, Earth and Space							
	EYFS	1	2	3	4	5	6
Key Knowledge Bold to be retained by all	Identify different features outdoors eg <i>cold, damp, shady</i> warm areas.	<p>Say what differences there are between the four seasons.</p>				<p>Know we live on a planet.</p> <p>Know planets orbit a star, in our case the sun.</p> <p>Remember they must not look directly at the sun even with dark glasses.</p>	

		-Know the sun gives us warmth and light				<p>Know there are 8 planets in our <i>solar system</i>, and name them</p> <p>Know planets may have moons <i>orbiting</i> them.</p> <p>Know the Earth, Moon and Sun are roughly <i>spherical</i>.</p> <p>Know we have day and night because the earth turns.</p> <p>Know the sun does not move – it just seems to because the earth is <i>rotating</i></p>	
Possible class tasks		<p>How does the weather change across the seasons?</p> <p>Describing the weather changes across the seasons.</p> <p>Collect and record data across the seasons.</p> <p>Weather, Rainfall, temperature, and wind.</p> <p>Seasonal walks</p> <p>Monitor seasonal changes.</p> <p>to observe differences</p> <p>Answer questions: (moved from EYFS)</p> <p>How does the weather change in Summer?</p> <p>What happens in Spring?</p> <p>How does the weather change in Spring?</p> <p>What happens in Summer?</p>				<p>Observe the different phases of the Moon?</p> <p>Children to monitor the changes of the moon phase over a period of 28 days and record – will they be able to do this? What time would they need to be awake?</p> <p>Video lapse of shadows moving/day and night</p> <p>Can we show the rotation of the Earth?</p>	
Working Scientifically focus							
Vocab		Snow, rain, wind, day length, heat, cold, seasons.					